

Worksheets 16-13 and 16-15 Review:

16-13: Equation:  $P(X) = {}_n C_x p^x q^{n-x}$

A)  $P(\overset{x}{2} \text{ in } \overset{n}{5}) = {}_5 C_2 (0.27)^2 (0.73)^3 = 0.28$

B)  $P(3 \text{ in } 10) = {}_{10} C_3 (.27)^3 (.73)^7 = 0.26$

C)  $P(1 \text{ or } 2 \text{ in } 5) = {}_5 C_1 (.27)^1 (.73)^4 + {}_5 C_2 (.27)^2 (.73)^3$   
 $= 0.67$

D)  $P(\text{at least } 1 \text{ in } 8) = 1 - P(0 \text{ in } 8)$   
 $= 1 - [{}_8 C_0 (.27)^0 (.73)^8]$   
 $= 0.92$

16-15: #1

$$a) P(3 \text{ in } 7) = {}_7C_3 (.1)^3 (.9)^4 = 0.02$$

$$b) P(2 \text{ in } 5) = 0.07$$

$$c) P(4 \text{ or } 5 \text{ in } 10) = P(4 \text{ in } 10) + P(5 \text{ in } 10) \\ = 0.01$$

$$d) P(\emptyset \text{ in } 10) = 0.35$$

$$e) P(X \geq 1) = 1 - P(X = \emptyset) \\ = 1 - [{}_ {10}C_{\emptyset} (.1)^{\emptyset} (.9)^{10}] \\ = 0.65$$

#2

$$a) P(3 \text{ in } 5) = {}_5L_3 (.21)^3 (.79)^2 = 0.06$$

$$b) P(\text{at least } 3 \text{ in } 5) = 1 - [P(\emptyset \text{ in } 5) + P(1 \text{ in } 5) + P(2 \text{ in } 5)]$$
$$= 0.07$$

$$c) P(\text{at most } 3) = P(\emptyset \text{ in } 5) + P(1 \text{ in } 5) + P(2 \text{ in } 5) + P(3 \text{ in } 5)$$
$$= 0.99$$

#3

$$P(\text{more than } 3 \text{ in } 10) = 1 - [P(\emptyset \text{ in } 15) + P(1 \text{ in } 15) + P(2 \text{ in } 15)]$$
$$= 0.22$$

- Success/Failure Condition:
  - Binomial model is approximately normal if we expect at least 10 successes and 10 failures
  - $np \geq 10$  and  $nq \geq 10$ 
    - $\downarrow$   $\rightarrow$  prob. success       $\rightarrow$  prob. failure
    - $\rightarrow$  # trials
- Statistically Significant:
  - Means that it is unreasonable to believe results happened simply by chance
  - More than 2 standard deviations above or below mean is considered statistically significant